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10/755,429	01/12/2004	Robert S. Nemiroff	BCS03181	9697

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EXAMINER	
WERNER, DAVID N	
ART UNIT	PAPER NUMBER
2621	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/755,429	NEMIROFF ET AL.	
	Examiner	Art Unit	
	David N. Werner	2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 August 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on *12 January 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This Office action for US Patent Application 10/755,429 is in response to the Request for Continued Examination filed 08 August 2008, in response to the Advisory Action of 07 July 2008. Currently, claims 1-28 are pending.

2. In the Final rejection of 12 May 2008, claim 28 was rejected under 35 U.S.C. 101 as non-statutory. Claims 9 and 23 were rejected under 35 U.S.C. 112, first paragraph, as containing new matter. Claims 10, 12, 24, and 26 were rejected under 35 U.S.C. 112, second paragraph, as indefinite. Claims 1-9, 11, 13-23, 25, 27, and 28 were rejected under 35 U.S.C. 103(a) as obvious over US Patent 5,687,095 A (Haskell et al.) in view of US Patent Application Publication 2002/0106022 A1 (Satoh et al.). Claim 10 was objected to for failing to limit a parent claim.

Continued Examination Under 37 CFR 1.114

3. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 08 August 2008 has been entered.

Response to Amendment

4. Applicant's amendment to claim 28 is insufficient to overcome the rejection under 35 U.S.C. 101.

5. Applicant's amendments to claims 10, 12, 24, and 26 have been fully considered. The rejection of claims 10, 12, 24, and 26 under 35 U.S.C. 112, second paragraph, is withdrawn.

Response to Arguments

6. Applicant's arguments, see page 9, filed 08 August 2008, with respect to claim 10 have been fully considered and are persuasive. The objection of claim 10 has been withdrawn.

7. Applicant's arguments, see page 10, filed 08 August 2008, with respect to claims 9 and 23 have been fully considered and are persuasive. The rejection of claims 9 and 23 under 35 U.S.C. 112, first paragraph has been withdrawn.

8. Applicant's arguments with respect to claims 1, 13, and 26-28 have been considered but are moot in view of the new ground(s) of rejection. As discussed in the Final Rejection of 12 May 2008 and the Advisory Action of 07 July 2008, the current amendment of determining an adjustment factor "that is a ratio" of a number of bits in a frame and a target number of bits is not disclosed in the Haskell or Satoh references. However, US Patent 7,079,581 B2 (Noh et al.) fully discloses this limitation.

Claim Rejections - 35 USC § 101

9. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

10. Claim 28 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

The relevant portions of the USPTO "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility" (O.G. Notice of 22 November 2005), Annex IV, read as follows:

> Claims that recite nothing but the physical characteristics of a form of energy, such as a frequency, voltage, or the strength of a magnetic field, define energy or magnetism, per se, and as such are nonstatutory natural phenomena. *O'Reilly*, 56 U.S. (15 How.) at 112-14. Moreover, it does not appear that a claim reciting a signal encoded with functional descriptive material falls within any of the categories of patentable subject matter set forth in Sec. 101.
>
> On the other hand, from a technological standpoint, a signal encoded with functional descriptive material is similar to a computer-readable memory encoded with functional descriptive material, in that they both create a functional interrelationship with a computer. In other words, a computer is able to execute the encoded functions, regardless of whether the format is a disk or a signal.
>
> These interim guidelines propose that such signal claims are ineligible for patent protection because they do not fall within any of the four statutory classes of Sec. 101.

Claim 28, as amended, specifies a "computer readable storage medium encoding program instructions". Normally, this claim would be statutory. However, since the phrase "computer readable storage medium" is not explicitly defined in the specification, the ordinary use of the phrase must be used, here, encompassing statutory media such as "non-writable storage media" and "writable storage media" as well as *non-statutory* matter such as "information conveyed to a computer by a

communications medium", "information downloaded from the Internet", and "signal-bearing media".

A signal embodying functional descriptive material is neither a process nor a product (i.e., a tangible "thing") and therefore does not fall within one of the four statutory classes of §101. Rather, a signal is a form of energy, in the absence of any physical structure or tangible material. See *In re Nuijten*, 84 USPQ2d 1495, 85 USPQ2d 1927 (Fed. Cir. 2007, *en banc* denied 2008).

Because the full scope of the claim as properly read in light of the disclosure encompasses non-statutory subject matter, the claim as a whole is non-statutory.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

12. Claims 1-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 5,687,095 A (Haskell et al.) in view of US Patent Application Publication 2002/0106022 A1 (Satoh et al.), and in view of US Patent 7,079,581 B2 (Noh et al.).

Haskell et al. teaches a system for converting a video transmission bit rate. Regarding step (a) of claim 1 and claim 13, Haskell et al. determines the target number of bits per macroblock to be output based on a desired output rate signal and a buffer status signal (column 5: lines 28-31). The buffer status signal is the occupancy rate of a

transmission buffer that outputs re-encoded compressed video data at a constant bit rate, and so is a measure of the number of actual bits per frame (column 5: lines 4-12). Regarding step (b) of claim 1 and claim 13, Haskell et al. calculates the average number of bits per frame (column 9: lines 8-14). Regarding steps (c) and (d) of claim 1 and claim 13, Haskell et al. calculates a target number of bits per frame and per macroblock based on a constant, the target video output rate, the maximum frame rate, and the total number of macroblocks in the frame. The target macroblock rate corresponds with the activity value for the "sets", and the target frame rate corresponds with the activity of the "set of sets", as well as the target number of bits for a frame in step (a). However, Haskell et al. does not teach determining an adjustment factor as the ratio between an actual number of bits in a frame and a target number of bits, as required in step (a) of claim 1 and claim 13, nor does it teach normalizing the spatial activity value, as required in step (d) of claim 1 and claim 13.

Noh et al. teaches a variable bit rate control system for a digital video encoder. Regarding step (a) of claims 1 and 13, Noh et al. calculates a parameter r as a deviation between a "production rate" and a "target bit rate". More precisely, "r is defined as a value that is obtained by dividing the actual production rate of bit by the target bit rate. For instance, if the target bit rate is 1 and the parameter r is larger than 1, it is understood that many bits are produced, whereas if the target bit rate is 1 and the parameter r is smaller than 1, little bits are produced" (column 8: lines 19-30). Parameter r is then used to determine an acceptable variation from a target bit rate within a safe range to prevent buffer overflow or underflow and adjust a quantization

parameter (column 8: lines 31-60). Then, parameter r of Noh et al. corresponds with the claimed adjustment factor.

Haskell et al. discloses a majority of the claimed invention except for producing a quantization adjustment factor as a ratio of an actual bit rate to a target bit rate. Noh et al. teaches that it was known to produce a parameter which is the ratio of a production bit rate and a target bit rate. Therefore, it would have been obvious to one having ordinary skill in the art at the time of the present invention to use this ratio as an adjustment factor, since Noh et al. states in column 8: line 54–column 9: line 8 that such a modification would allow an image quality to be kept high within a variable-bit-rate encoding system while still regulating encoder buffer flow.

However, the presently claimed invention encompasses specific calculations for the spatial activity value in response to specific data in the video, as shown in claims 6-8, and the calculation of a normalized spatial activity value, for example, in claims 1d and 9. However, Haskell et al. and Noh et al. do not show these limitations.

Satoh et al. teaches a transcoder for converting from MPEG-2 video to MPEG-4 video. Regarding claim 1d, 9, 10, 13d, 23, and 24, equation 22 of Satoh gives a normalized activity calculation identical to that presently claimed, except f(rcFactor) is set to 2. However, it is respectfully submitted that when parameter r of Noh et al. is 2, that is, when an actual number of bits in a frame is twice the target number of bits, as described in the calculation of f(rcFactor) in claims 10 and 24, the normalized spatial activity value calculation of claims 1d and 13d, as shown in claims 9 and 23, reduces to equation 22 of Satoh et al. Applicant is reminded that a prior art species anticipates a

claimed genus (MPEP 2131.02), and that a prior art specific example anticipates a range that includes the example (MPEP 2131.03).

Haskell et al., in combination with Noh et al., discloses the claimed invention except for details of measuring data complexity. Satoh et al. teaches that it was known to measure video frame complexity according to both the number of coded bits per frame and the quantization scale for a frame. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to generate a picture complexity measure according to specific picture details as taught by Satoh et al., since Satoh et al. states in paragraph [0025] that such a modification would be useful to generate an accurate calculation for the number of bits to allocate to a transcoded frame.

Regarding independent claim 26, figure 1 of Haskell et al. shows decoder 104, DCT coefficient processor 107, encoder 109, and controller 113, and regarding independent claim 27, these components are considered equivalent to those shown in figure 1 and described in the specification of the present invention, and so fall within the limitations implied by 35 U.S.C. 112, sixth paragraph, according to the means-plus-function language of the claim. Regarding independent claim 28, the system of Haskell et al. may be implemented on a general-purpose microprocessor, a DSP, or a programmable video-processing chip (column 14: lines 24-30).

Regarding claims 2 and 14, in one embodiment of Haskell et al., the amount of data output is controlled by requantizing the DCT coefficients of a macroblock (column 10: lines 49-57).

Regarding claims 3 and 15, after processing one macroblock, the system of Haskell et al. updates the buffer status and the control signal controlling the adjustment to the amount of data to be output (column 9: lines 42-65).

Regarding claims 4 and 16, after processing a macroblock, Haskell et al. checks to see if a frame is finished, and if it is, updates frame parameters (column 10: lines 4-8).

Regarding claims 5 and 17, after processing each frame, Haskell et al. recalculates the number of bits per frame, target bits for the next frame, and the control signal (column 10: lines 8-22).

Regarding claim 6, in one embodiment of Haskell et al., the difference between targeted bits per macroblock and actual bits per macroblock determines the number of DCT indices to be retained and the number to be suppressed to zero (column 9: line 60–column 10: line 3).

Regarding claim 7, in Haskell, the values of DCT coefficients are directly proportional to the quantization parameter. Therefore, by adjusting the quantization parameter, coefficient values are inherently adjusted. Additionally, in Satoh et al., global complexity measure X for a frame is determined according to S, the number of coded bits in a picture (paragraph 0021). Since MPEG-2 and MPEG-4 use variable-length coding techniques in which larger DCT coefficients take more bits than small

coefficients, a high number of bits per picture may indicate a high number of DCT coefficients or large values thereof.

Regarding claim 8, in one embodiment of Haskell et al., the difference between targeted bits per macroblock and actual bits per macroblock determines the size of the DCT quantization parameter (column 11: lines 56-63). Additionally, in Satoh et al., global complexity measure X is also dependent on Q, the average quantization scale code for the frame (paragraphs 0021-0022).

Regarding claims 11 and 25, the function f(rcFactor) = rcFactor is piecewise continuous across its domain.

Regarding claim 12, equation 23 of Satoh et al. discloses the special case of the equation in which rcFactor is 1 (that is, when the target bit rate is equal to the actual bit rate), and so no adjustment is performed (paragraph 0040).

Regarding claim 18, Satoh et al. keeps separate global complexity measures and separate allocation bit amounts for I-frames, P-frames, and B-frames (paragraphs 0021, 0025), and so only compares frames with other frames of the same type, and regarding claim 19, in Satoh et al, the quantization scale for a B-frame is kept at 1.4 times that of an I-frame or P-frame (paragraphs 0023-0024).

Regarding claim 20, Haskell et al. preferably operates on H.261 video, which encodes macroblocks with the Discrete Cosine Transform, or DCT (column 4: lines 27–29).

Regarding claims 21 and 22, H.261 coding was known to encode each macroblock with six DCT blocks, including four luma blocks and two chroma blocks

(column 7: line 62–column 8: line 22). Since claim 21 does not state that determining spatial activity is performed "only" among luma blocks, a determination of spatial activity according to both H.261 luma and chroma blocks is within the scope of both claims 21 and 22.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David N. Werner whose telephone number is (571)272-9662. The examiner can normally be reached on Monday-Friday from 10:00-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mehrdad Dastouri can be reached on (571) 272-7418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. N. W./
Examiner, Art Unit 2621

/Mehrdad Dastouri/
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